5. Massive gastro-intestinal hemorrhage results from ulceration of the mucosa.

6. Clinical tetany may be present in patients with acute pancreatitis.

7. Shock is not a characteristic finding of acute pancreatitis.

8. The course of the disease can best be determined by study of the temperature chart.

9. The pulse range has no typical pattern.

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Spontaneous Fracture of the First Rib Due to Muscle Pull

A Case Report

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FRACTURES of the first rib unassociated with other fractures are very rare. Spontaneous fractures of the first rib due to muscle pull are even more rare, being 6 per cent of all fractures of the first rib as quoted by Breslin,[2] Knoepp.[7]

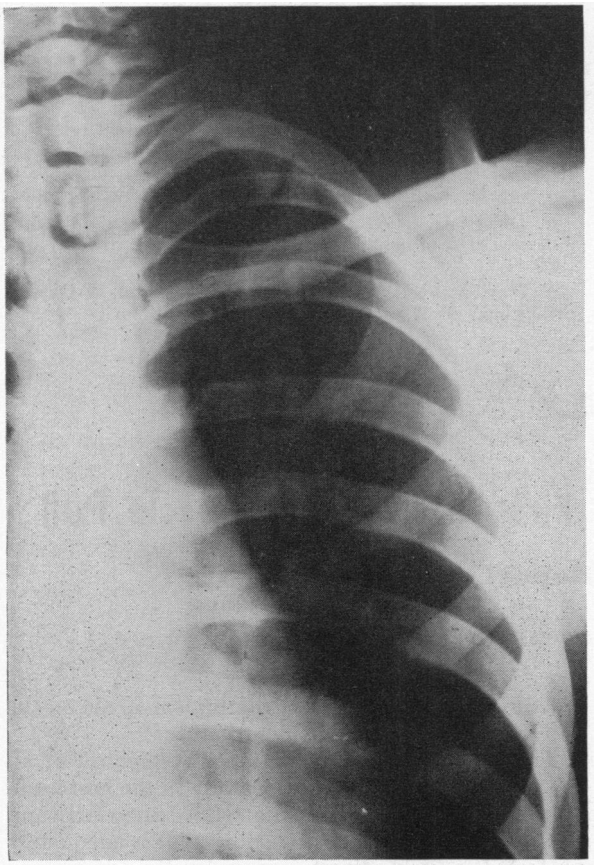
Breslin in 1937 reported five cases and in reviewing the literature through 1933 he found 27 cases of isolated fracture of the first rib and two of these were due to muscle pull. Outland and Hanlon[10] in 1938 reported one case due to muscle pull. Aitken and Lincoln[1] in 1939 reported a case of fracture of the first rib due to muscle pull. Kulowski and Ryan[8] in 1940 reported one case of isolated bilateral fracture of the first rib in which evidence of brachial plexus damage appeared a few months after the injury with an unilateral Horner's syndrome. Knoepp[7] in 1941, in a review of 386 cases of rib fractures of all types, found 32 isolated fractures of the first rib, and two of these were due to muscle pull. Cohen[4] in 1943 reported three cases of isolated fracture of the first rib found in the course of routine roentgen examination of armed force selectees for tuberculous lesions. Garber[5] in 1944 reported one case due to muscle pull. He reviewed the literature and found about 64 reported cases of first rib fracture unilateral and bilateral, due to all causes. Gutman[6] in 1944 reported seven cases of isolated fracture of the first rib associated with blast forces. Bowie and Jacobson[3] in 1945 reported 17 cases, found in routine examination during the period of six months from August 1943 to February 1944, in which the first rib showed changes which could be interpreted as being due to fracture. They regarded their cases not as spontaneous fractures of the first rib, but as congenital anomalies. Proctor, Campbell and Abramson[11] in 1945, reported three cases of fracture of the first rib which they called fatigue fractures due to "continual rhythmical stress on the soft tissues supporting bony structure."

The first rib is the shortest and straightest of all the ribs and lies almost horizontally in the mid-neck. It is attached to the manubrium sterni anteriorly and the first dorsal vertebra posteriorly. It is adequately protected against direct injury by the clavicle in front and the scapula behind. Because of this apparently adequate protection, it is difficult to see how the rib can be fractured by direct trauma. It is the consensus that this uncommon fracture is ordinarily not caused by direct trauma, but by indirect or transmitted force. According to Lane,[9] the fracture is brought about in any one of three ways.

1. Indirect trauma—the force being conducted through the clavicle.
2. Direct trauma — the force being conducted through the back.
3. Indirect trauma—the force being transmitted through the manubrium sterni.

When trauma has played no role and an isolated fracture of the first rib is found, it is believed due to the contraction of the scalenus anticus muscle during great stress.[1,5,10]

There is usually complaint of pain, but frequently this symptom is absent or is so slight that it is disregarded by the patient, as is strikingly illustrated in the three cases reported by Cohen.[4] Many cases are found in the course of routine roentgen examination for other pathology, the patients giving no history of trauma and having no recollection of pain. Because of the absence of pain in some cases, Bowie and Jacobson[3] are "of the definite conviction that in all our cases the changes as demonstrated are due to anomalous development of the first rib." With spontaneous fracture due to scalenus anticus pull, how-



Roentgenogram shows fracture of first rib as described in the text.

ever, there is always a history of sudden onset of pain. In the few reported cases of spontaneous fracture due to muscle pull, there were no complications such as described by Breslin,[2] Knoepp[7] and others, and apparently complications do not occur in fractures of the first rib due to muscle pull. Healing is always uneventful either by callus formation or by the appearance of pseudarthrosis.

CASE REPORT

A Negro, 21 years of age, single and a professional boxer, while engaging in a boxing match on May 14, 1946, pulled his left hand back sharply and felt something snap in the left side of his neck. This was accompanied by severe sharp pain in the left supraclavicular area. He was able, however, to finish the match. For the next week or so, there was slight pain in the region of the left shoulder posteriorly, with no radiation of pain. As the discomfort persisted, he consulted a physician on May 24, 1946. Roentgen examination at this time showed a fracture of the left first rib. On May 27, 1946, when he first came under our care, he complained of very little discomfort in the left supraclavicular fossa with slight tenderness in the same region. There was no restriction of motion of the neck or left shoulder joint. On June 10, 1946, there were no complaints and no tenderness was found. Roentgen examination taken on that date showed fracture of the first rib at the junction of the posterior with the middle third on the left side with the fragments in good position and with no callus formation. Follow-up roentgen examinations are not available.

SUMMARY

1. Because of the infrequent occurrence, a case of spontaneous fracture of the first rib due to muscle pull is presented.

2. A review of the literature discloses only seven previously reported cases of fracture of the first rib due to muscle pull.

3. The fracture is brought about by contraction of the scalenus anticus muscle during physical stress, accompanied by sudden pain and followed by good recovery with no complications.

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